

## Description

The AH1883 micropower Omnipolar Hall Effect switch IC is designed for portable and battery powered equipment such as cellular phones, cordless phones, camcorders, PDA's, and portable PC's. Based on two high sensitivity Hall Effect plates and chopper stabilized architecture, the AH1883 provides reliable solution over the whole operating range.

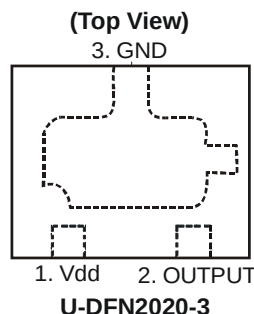
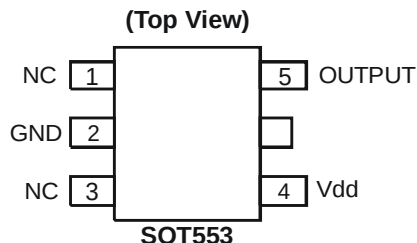
To support portable and battery powered equipment the design has been optimized to operate from 1.65V to 3.3V and consumes 13uW typical with a supply of 1.8V. To minimize PCB space the AH1883 includes a push-pull output structure, therefore does not require an external pull up resistor, and is packaged in small low profile SOT553 and U-DFN2020-3 packages.

Either North or South pole of sufficient strength will turn the output on. When the magnetic flux density (**B**) is larger than operate (**Bop**) the output is switched on. The output is turned off when B becomes lower than the release point (**Brp**). The output will remain off when there is no magnetic field.

## Features

- Micropower operation
- Operation with North or South Pole
- 1.65V to 3.3V battery operation
- Chopper stabilized
  - o Superior temperature stability
  - o Extremely Low Switch-Point Drift
  - o Insensitive to Physical Stress
- Good RF noise immunity
- -40°C to 85°C operating temperature
- ESD (HBM) > 6kV in SOT553 and U-DFN2020-3
- Small low profile packages: SOT553 and U-DFN2020-3
- "Green" Molding Compound

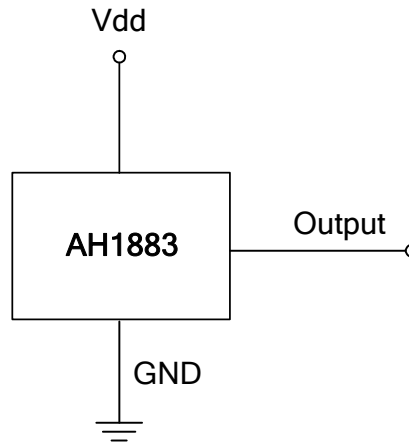
## Pin Assignments



## Applications

- Cellular phone
- PDA
- Portable PCs – Netbook, Notebook, Tablets
- Camcorders
- Cordless phone
- Handheld game consoles
- Proximity detection and contact-less switch applications

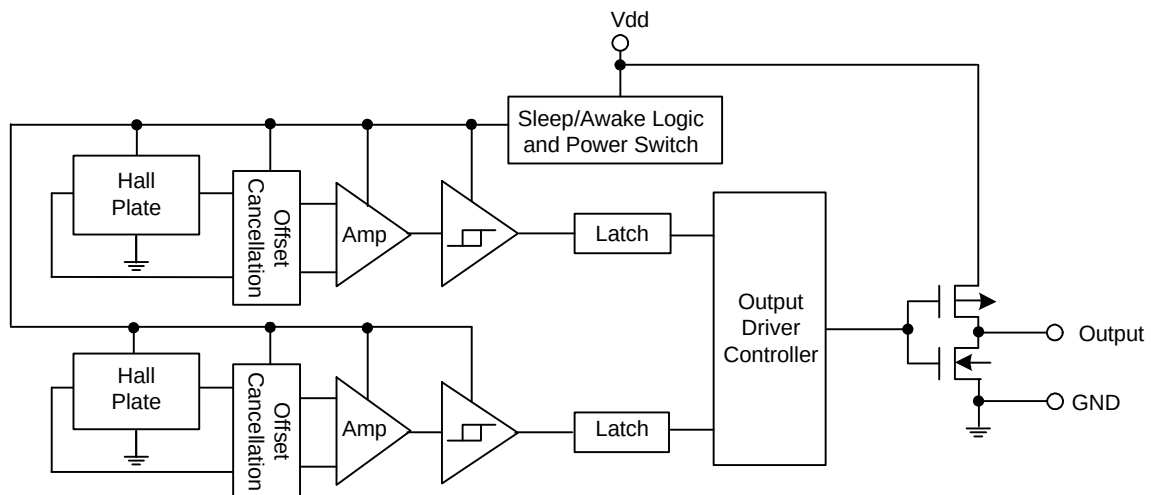
## Typical Application Circuit



## Pin Descriptions

| Pin Name | P/I/O | Pin # | Description               |
|----------|-------|-------|---------------------------|
| NC       |       | 1     | No Connection             |
| GND      | P/I   | 2     | Ground                    |
| NC       |       | 3     | No Connection             |
| Vdd      | P/I   | 4     | Power Supply Voltage      |
| Output   | O     | 5     | Output Pin ( active Low ) |

## Functional Block Diagram



### Absolute Maximum Ratings ( $T_A = 25^\circ\text{C}$ , Note 1)

| Symbol          | Characteristics              | Values      | Unit |
|-----------------|------------------------------|-------------|------|
| V <sub>DD</sub> | Supply voltage               | 5           | V    |
| B               | Magnetic flux density        | Unlimited   |      |
| T <sub>S</sub>  | Storage Temperature Range    | -65 to +150 | °C   |
| P <sub>D</sub>  | Package Power Dissipation    | 230         | mW   |
| T <sub>J</sub>  | Maximum Junction Temperature | 150         | °C   |

Notes: 1. Stresses greater than the 'Absolute Maximum Ratings' specified above, may cause permanent damage to the device. These are stress ratings only; functional operation of the device at these or any other conditions exceeding those indicated in this specification is not implied. Device reliability may be affected by exposure to absolute maximum rating conditions for extended periods of time

### Recommended Operating Conditions ( $T_A = 25^\circ\text{C}$ )

| Symbol          | Parameter                   | Conditions | Rating      | Unit |
|-----------------|-----------------------------|------------|-------------|------|
| V <sub>DD</sub> | Supply Voltage              | Operating  | 1.65 to 3.3 | V    |
| T <sub>A</sub>  | Operating Temperature Range | Operating  | -40 to +85  | °C   |

### Electrical Characteristics ( $T_A = 25^\circ\text{C}$ , V<sub>DD</sub> = 1.8V, unless otherwise specified)

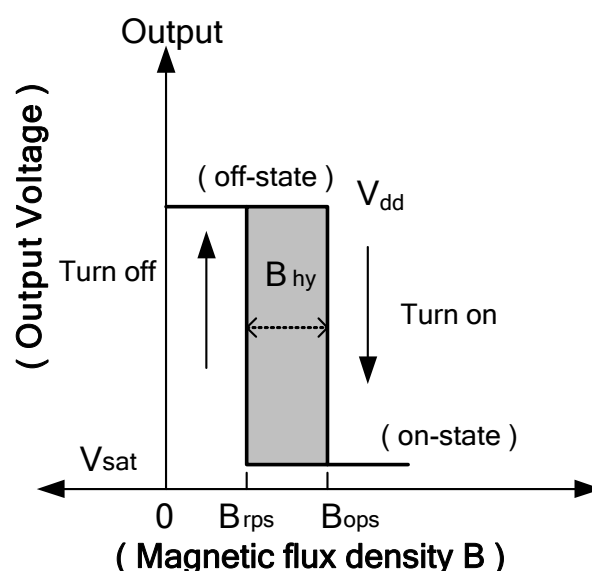
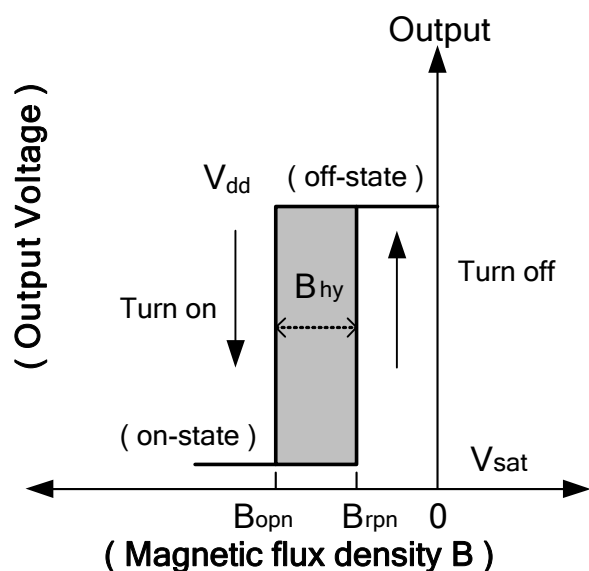
| Symbol                | Characteristic                | Conditions              | Min                  | Typ. | Max | Unit |
|-----------------------|-------------------------------|-------------------------|----------------------|------|-----|------|
| V <sub>OH</sub>       | Output On Voltage (High side) | I <sub>O</sub> = -0.5mA | V <sub>DD</sub> -0.2 | -    | -   | V    |
| V <sub>OL</sub>       | Output On Voltage (Low side)  | I <sub>O</sub> = 0.5mA  | -                    | -    | 0.2 | V    |
| I <sub>DD</sub> (en)  | Supply Current                | Chip enable             | -                    | 2    | 4   | mA   |
| I <sub>DD</sub> (dis) |                               | Chip disable            | -                    | 5    | 8   | uA   |
| I <sub>DD</sub> (avg) |                               | average supply current  | -                    | 7    | 12  | uA   |
| T <sub>awake</sub>    | Awake Time                    |                         | -                    | 50   | 100 | μs   |
| T <sub>period</sub>   | Period                        |                         | -                    | 50   | 100 | ms   |
| D.C.                  | Duty Cycle                    |                         | -                    | 0.1  | -   | %    |

**Magnetic Characteristics ( $T_A = 25^\circ\text{C}$ ,  $V_{dd} = 1.8\text{V} \sim 3.0\text{V}$ , Note 2 & 3)**

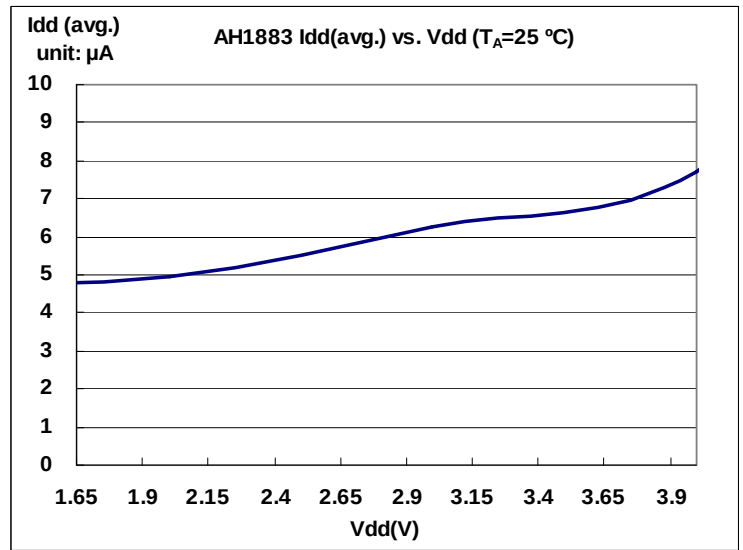
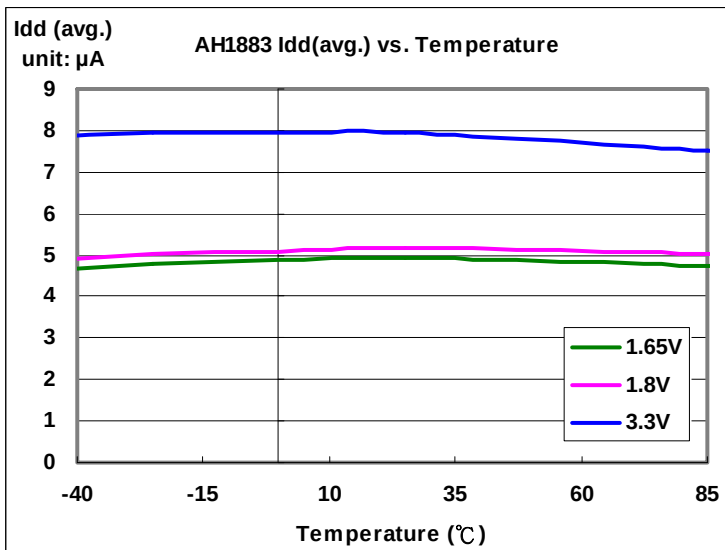
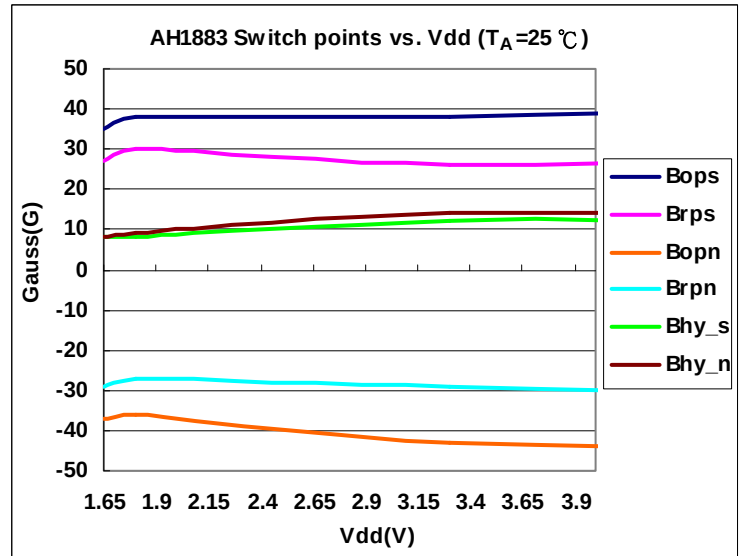
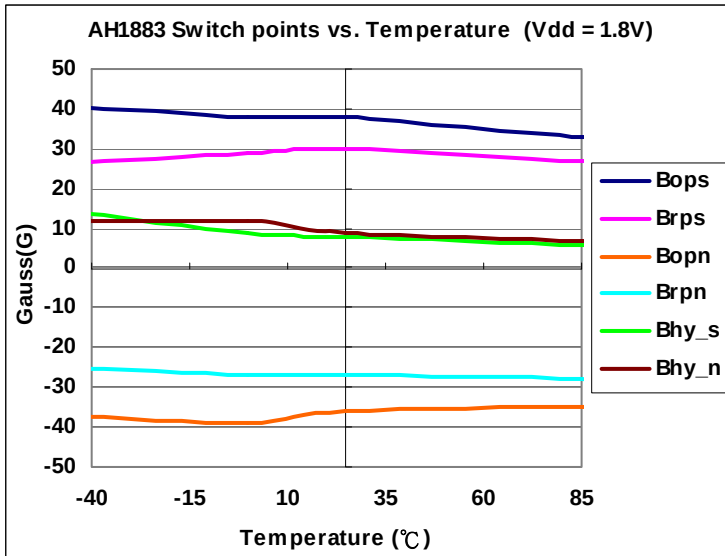
(1mT=10 Gauss)

| Symbol                         | Characteristic | Min | Typ. | Max | Unit  |
|--------------------------------|----------------|-----|------|-----|-------|
| Bops(south pole to brand side) | Operate Point  | -   | 37   | 55  | Gauss |
| Bopn(north pole to brand side) |                | -55 | -37  | -   |       |
| Brps(south pole to brand side) | Release Point  | 6   | 29   | -   |       |
| Brpn(north pole to brand side) |                | -   | -29  | -6  |       |
| Bhy( Bopx - Brpx )             | Hysteresis     | 3   | 8    | -   |       |

Notes: 2. Typical data is at  $T_A = 25^\circ\text{C}$ ,  $V_{dd} = 3\text{V}$ , and for design information only.  
3. The magnetic characteristics may vary with supply voltage, operating temperature and after soldering.



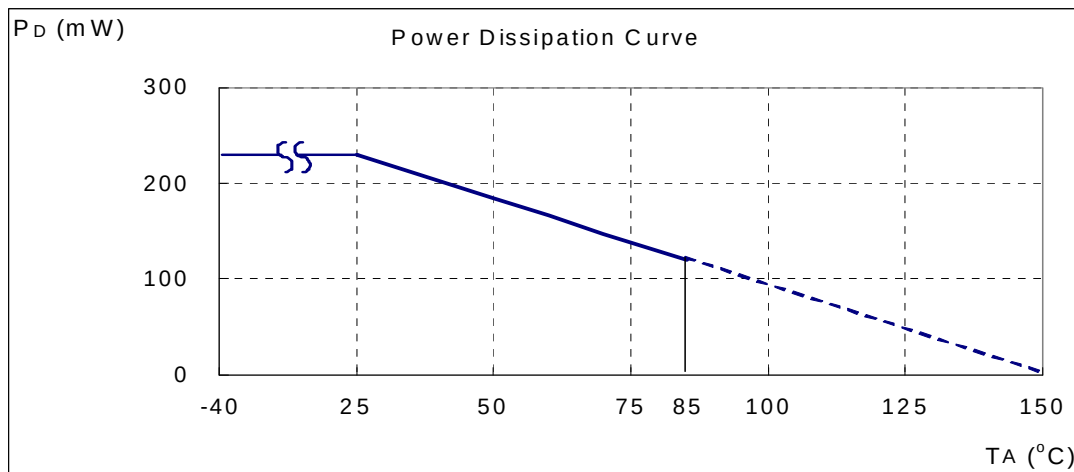
## Typical Operating Characteristics



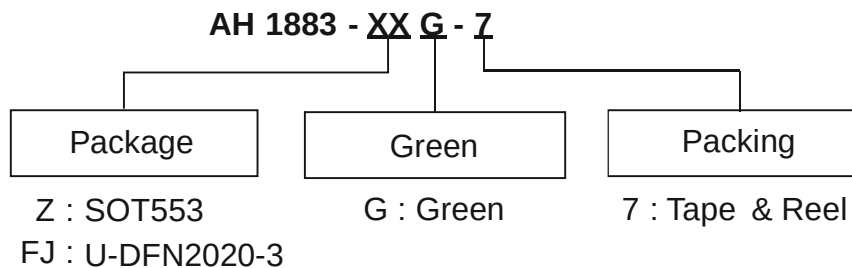
### Performance Characteristics

For SOT553 and U-DFN2020-3

| T <sub>A</sub> (°C) | 25  | 50  | 60  | 70  | 80  | 85  | 90  | 100 | 110 | 120 | 130 | 140 | 150 |
|---------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| P <sub>D</sub> (mW) | 230 | 184 | 166 | 147 | 129 | 120 | 110 | 92  | 74  | 55  | 37  | 18  | 0   |



### Ordering Information



| Device       | Package Code | Packaging (Note 4 & 5) | 7" Tape and Reel |                    |
|--------------|--------------|------------------------|------------------|--------------------|
|              |              |                        | Quantity         | Part Number Suffix |
| AH1883-ZG-7  | Z            | SOT553                 | 3000/Tape & Reel | -7                 |
| AH1883-FJG-7 | FJ           | U-DFN2020-3            | 3000/Tape & Reel | -7                 |



Notes: 4. EU Directive 2002/95/EC (RoHS). All applicable RoHS exemptions applied. Please visit our website at [http://www.diodes.com/products/lead\\_free.html](http://www.diodes.com/products/lead_free.html).  
 5. Pad layout as shown on Diodes Inc. suggested pad layout document AP02001, which can be found on our website at <http://www.diodes.com/datasheets/ap02001.pdf>.

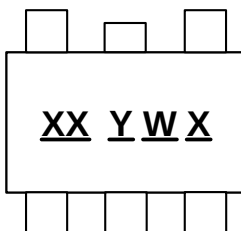
---

**Marking Information**

---

**(1) SOT553**

**( Top View )**

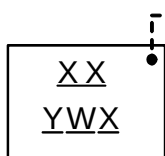


XX : Identification Code  
Y : Year : 0~9  
W : Week : A~Z : 1~26 week;  
           a~z : 27~52 week;  
           z represents 52 and 53 week  
X : Internal code

| Part Number | Package | Identification Code |
|-------------|---------|---------------------|
| AH1883      | SOT553  | KP                  |

**(2) U-DFN2020-3**

**( Top View )**

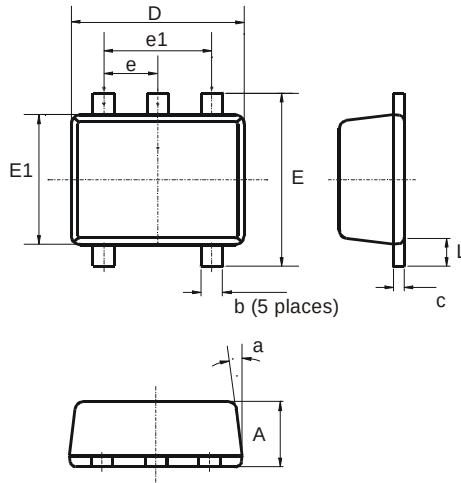


Pin 1 indicator  
XX : Identification Code  
Y : Year : 0~9  
W : Week : A~Z : 1~26 week;  
           a~z : 27~52 week;  
           z represents 52 and 53 week  
X : Internal code

| Part Number | Package     | Identification Code |
|-------------|-------------|---------------------|
| AH1883      | U-DFN2020-3 | KP                  |

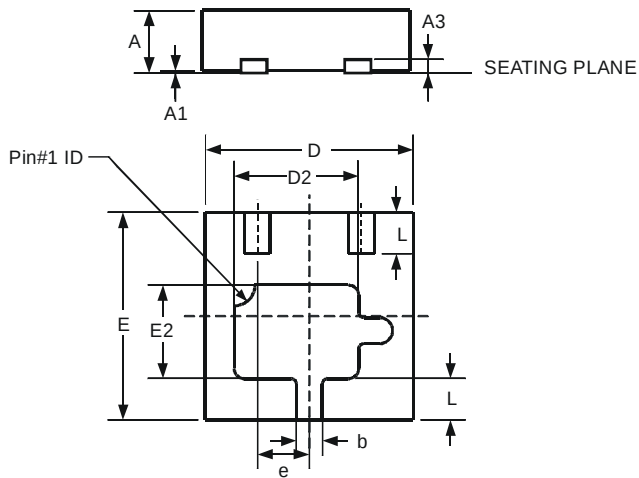
**Package Outline Dimensions (All Dimensions in mm)**

**(1) Package Type: SOT553**



| SOT553               |          |      |      |
|----------------------|----------|------|------|
| Dim                  | Min      | Max  | Typ  |
| A                    | 0.55     | 0.60 | 0.60 |
| c                    | 0.10     | 0.18 | 0.15 |
| D                    | 1.50     | 1.70 | 1.60 |
| E                    | 1.55     | 1.70 | 1.60 |
| E1                   | 1.10     | 1.25 | 1.20 |
| L                    | 0.10     | 0.30 | 0.20 |
| b                    | 0.15     | 0.30 | 0.20 |
| e                    | 0.50 Typ |      |      |
| e1                   | 1.00 Typ |      |      |
| a                    | 6°       | 8°   | 7°   |
| All Dimensions in mm |          |      |      |

**(2) Package Type: U-DFN2020-3**

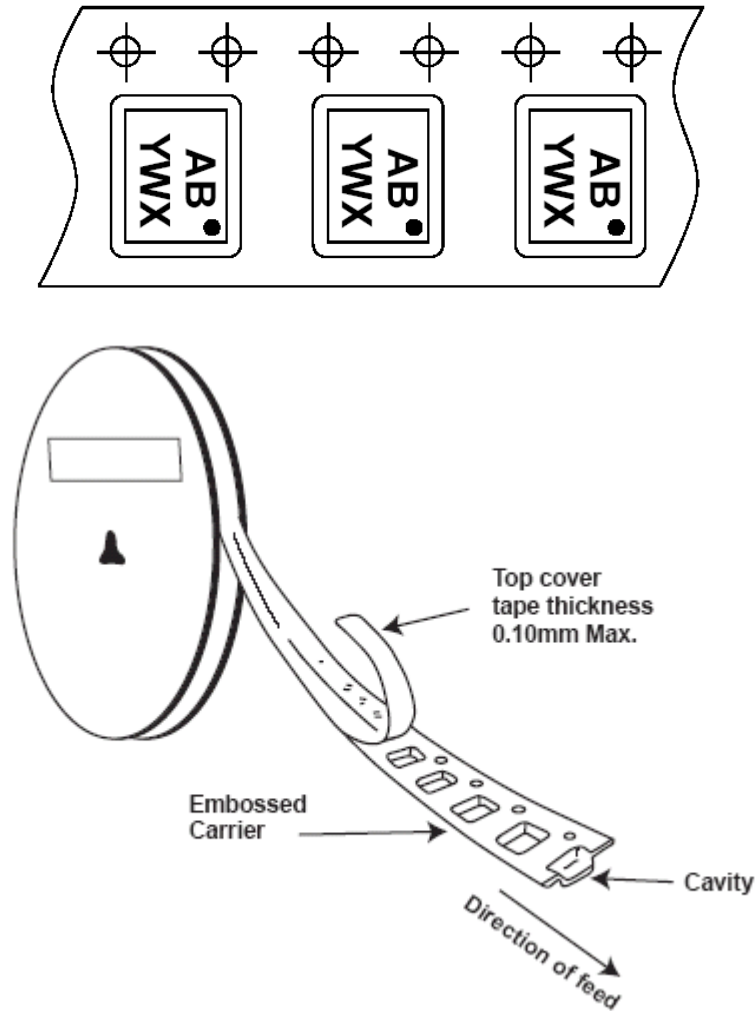


| U-DFN2020-3          |      |       |       |
|----------------------|------|-------|-------|
| Dim                  | Min  | Max   | Typ   |
| A                    | 0.57 | 0.63  | 0.60  |
| A1                   | 0    | 0.05  | 0.02  |
| A3                   | —    | —     | 0.152 |
| b                    | 0.20 | 0.30  | 0.25  |
| D                    | 1.95 | 2.075 | 2.00  |
| D2                   | 1.10 | 1.30  | 1.20  |
| e                    | —    | —     | 0.50  |
| E                    | 1.95 | 2.075 | 2.00  |
| E2                   | 0.80 | 1.00  | 0.90  |
| L                    | 0.35 | 0.45  | 0.40  |
| All Dimensions in mm |      |       |       |



## Taping Orientation (Note 6)

For U-DFN2020-3



Notes: 6. The taping orientation of the other package type can be found on our website at <http://www.diodes.com/datasheets/ap02007.pdf>.

### IMPORTANT NOTICE

DIODES INCORPORATED MAKES NO WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, WITH REGARDS TO THIS DOCUMENT, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE (AND THEIR EQUIVALENTS UNDER THE LAWS OF ANY JURISDICTION).

Diodes Incorporated and its subsidiaries reserve the right to make modifications, enhancements, improvements, corrections or other changes without further notice to this document and any product described herein. Diodes Incorporated does not assume any liability arising out of the application or use of this document or any product described herein; neither does Diodes Incorporated convey any license under its patent or trademark rights, nor the rights of others. Any Customer or user of this document or products described herein in such applications shall assume all risks of such use and will agree to hold Diodes Incorporated and all the companies whose products are represented on Diodes Incorporated website, harmless against all damages.

Diodes Incorporated does not warrant or accept any liability whatsoever in respect of any products purchased through unauthorized sales channel.

Should Customers purchase or use Diodes Incorporated products for any unintended or unauthorized application, Customers shall indemnify and hold Diodes Incorporated and its representatives harmless against all claims, damages, expenses, and attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized application.

Products described herein may be covered by one or more United States, international or foreign patents pending. Product names and markings noted herein may also be covered by one or more United States, international or foreign trademarks.

### LIFE SUPPORT

Diodes Incorporated products are specifically not authorized for use as critical components in life support devices or systems without the express written approval of the Chief Executive Officer of Diodes Incorporated. As used herein:

A. Life support devices or systems are devices or systems which:

1. are intended to implant into the body, or
2. support or sustain life and whose failure to perform when properly used in accordance with instructions for use provided in the labeling can be reasonably expected to result in significant injury to the user.

B. A critical component is any component in a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or to affect its safety or effectiveness.

Customers represent that they have all necessary expertise in the safety and regulatory ramifications of their life support devices or systems, and acknowledge and agree that they are solely responsible for all legal, regulatory and safety-related requirements concerning their products and any use of Diodes Incorporated products in such safety-critical, life support devices or systems, notwithstanding any devices- or systems-related information or support that may be provided by Diodes Incorporated. Further, Customers must fully indemnify Diodes Incorporated and its representatives against any damages arising out of the use of Diodes Incorporated products in such safety-critical, life support devices or systems.

Copyright © 2011, Diodes Incorporated

[www.diodes.com](http://www.diodes.com)